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Artificial Teeth ✳ ✳ Without Plates.

The Merits and Claims of Crown- and Bridge-Work.

BY

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By J. L. WILLIAMS, D.D.S., Philadelphia, Pa.

I assume it to be a self-evident truth, that the true purpose of the conscientious dentist should be the exercise of his best efforts for the conservation of those conditions in the mouth which are in harmony with the laws which govern the organism as a unity.

That continued integrity of the body which we designate by the term health is primarily dependent upon the digestion and assimilation of food-material. Perfect digestion must begin in the mouth with the proper mastication of food. The preservation of the natural teeth, therefore, or the maintenance of the mouth in that condition which we find when there are healthy, well-preserved teeth, is the end toward which our energies as specialists should be directed.

It is my purpose to describe in this paper the principles of a mechanical appliance, or, to speak somewhat more elegantly, a form of dental prosthesis which is capable of being made of immeasurably greater value to humanity, in the preservation of that condition of the mouth of which I have just spoken, than all other forms combined. I make this statement upon the experience which I have gained by giving this work my almost exclusive attention for the past three years, during which time I have tested it under almost every conceivable condition. I refer to the so-called "Crown- and Bridge-Work." While something has been known for many years of the principles upon which this work is founded yet, the combination of all that is valuable in these principles which have been worked out by many inventive minds, into a *system* and the practical and successful application of that system is comparatively new. What is now known as Crown- and Bridge-Work may be said to be a method for restoring the teeth to a condition, which in every practical and artistic sense, closely approaches nature's own work. The teeth are as firm and immovable in mastication as are the natural teeth, and when properly and artistically constructed, it

is difficult for even a professional expert to detect their artificial character. It is also a process which in many instances is applicable when every other resource has failed; when the crowns of the natural teeth are completely broken down by decay, so that in the common order of things extraction of the roots and the insertion of a plate is the only thing to be done, then the teeth may be perfectly restored by this beautiful process.

The system is applicable from a single tooth to a full set. When three or four firm roots remain in either jaw in the proper position there may be inserted upon them a full set of teeth which will be immeasurably superior to anything ever before devised.

The process is as nearly painless as any operation in dentristry could be expected to be. In the most extensive operations the pain is far less than is usually experienced in the common operation of filling teeth. The great beauty of the work and the unbounded satisfaction which it gives to patients when it has been properly constructed, has sometimes tempted incompetent persons to undertake the work. As might be expected in any operation requiring more than ordinary skill and experience for its successful accomplishment, the result has almost always been a failure.

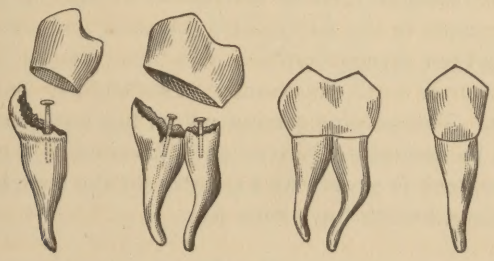
These operations have sometimes come to the notice of brother dentists whose opinions of the work have been founded upon these failures and the result has been adverse criticism on the work. I therefore deem it necessary for me to say that I have given this work my almost exclusive attention for the past three years, during which time there has not been, so far as I am aware, a single failure in the many operations which I have performed. While I cannot but regard this as a record which would be considered quite unusual in almost any line of professional work, yet, I should not feel justified in calling attention to it in this manner but for the fact, as already mentioned, that I sometimes hear of adverse criticism being passed upon the work.

It is to be understood that these crowns and bridges are permanently cemented to the teeth and roots upon which they are placed so that the decayed portion of the tooth or root becomes hermetically sealed and no further change can occur in the way of decay. The following illustrations will best explain the character of this work. The single crown, of which there are two forms, is the basis of all this work. The gold crown is most commonly used on the molar or back teeth. After the roots have been properly prepared a gold band is fitted around them, which is united by soldering. A top or cap for this band is made from pure gold by swaging between metal dies made from a great variety of patterns corresponding in style and shape with the natural teeth. This top or cap is soldered

to the band thus producing a hollow gold crown or shell which fits over the decayed tooth or root. Gold screws are sometimes set in the roots to give additional strength. When the crown is ready for final adjustment it is partly filled with a fine white cement (the same as is sometimes used in filling teeth) and while this is soft the crown is pressed into its proper position. The cement hardens in a few moments and the operation is complete.

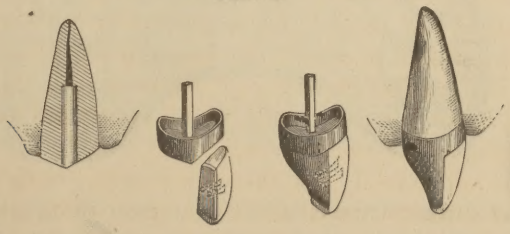
Fig. 1 shows these gold crowns before and after they are placed in position.

FIG. 1.



The porcelain faced crown for the front teeth is made as follows: After the end of the root is made perfectly smooth with corundum wheels and properly-shaped scalers, a gold ferrule or band is fitted around it. If it is desirable that this band should be entirely concealed, the labial surface of the root should be beveled a little above the margin of the gum, and after the band has been soldered it may be placed in position, and the line of contour of the margin of the

FIG. 2.



gum marked upon the front of the band. The proper bevel can then be cut and the edges squared upon a corundum wheel, leaving the lingual portion of the band a little longer than the front. Pure gold, rolled to No. 34 of the standard gauge (American), is used for soldering upon the beveled surfaces, thus making a closed cap for the end of the root. A suitable tooth is now selected and backed with pure platinum or pure gold. The cervical end of the tooth is then ground to the proper position on the front bevel of the cap, all of the fitting being done while the cap is in position on the root.

After the fitting is completed the cap is removed and the tooth attached by strong resin wax and again placed in position while the wax is warm. Any slight change in position which is necessary can then be easily made. The tooth and cap are now removed together, invested, and united at the back by solder. It is well to use a solder for the cap with a higher melting-point than that used for the backing, as it obviates the danger of unsoldering the band when the backing is flowed on. After finishing and polishing the work, the end of the root is made perfectly dry, a sufficient quantity of oxyphosphate cement, mixed somewhat thinner than for filling purposes, is placed in the enlarged pulp-canal and also in the cap. The crown is then carried to place with firm, steady pressure, and held a few minutes until the cement is sufficiently hard to prevent displacement. The surplus cement which has oozed out around the band should be carefully removed and the work is then completed.

The bridge-work is simply an extension of the crowns over spaces where the natural teeth have been lost.

FIG. 3.

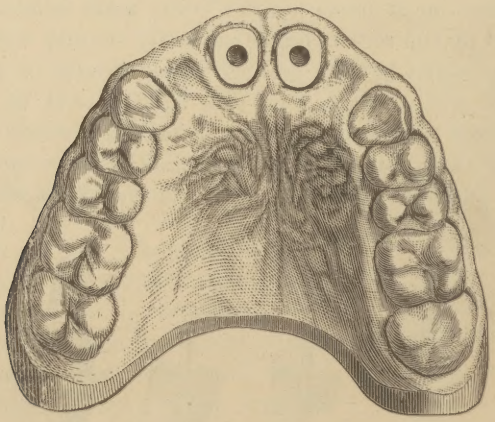


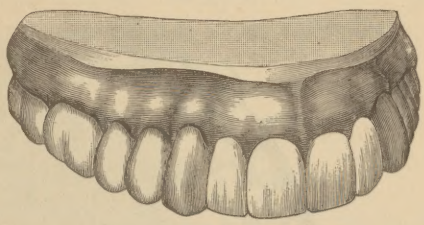
Fig. 3 was drawn from a model of a case in practice. In this case the roots of the centrals are shown prepared for the fitting of the bands, the laterals having been extracted. Single crowns are made for these roots precisely as I have described. They are then temporarily placed in position. Laterals are selected, backed, ground, and fitted to position. The laterals are then attached by means of strong wax to the centrals, carefully adjusted in the position which we wish them to occupy, and the whole removed in an impression of investing-material. An additional quantity of investment is mixed and poured over the exposed ends of the caps, and the whole allowed to harden, after which the investing material is

cut away from the backs of the teeth and crowns, and they are all united by soldering.

Fig. 4 shows the work completed, and Fig. 5 is from a model of the mouth as restored with the crowns.

Fig. 4.

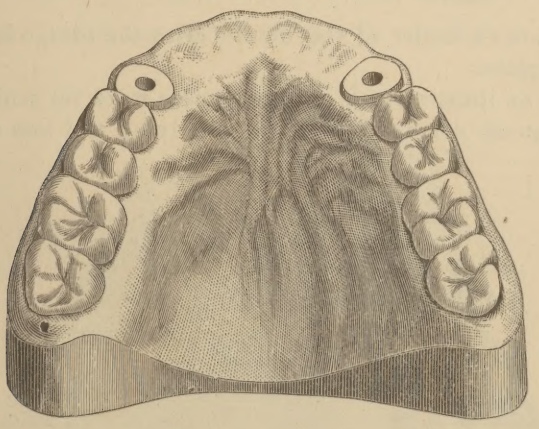
Fig. 5.



In cases where the space is occasioned by the loss of more than one tooth a somewhat different method of procedure is necessary.

Fig. 6 shows a model of a mouth in which the superior laterals and centrals had been extracted. The canines were badly decayed,

Fig. 6.



with exposure of the pulp. The first step is the removal of the pulps from the canine roots as previously described. The crowns are then fitted as already described and placed in position. An impression is then taken in plaster, the crowns remaining imbedded on its removal. The impression is varnished and oiled, and a model of investing-material poured. After this has hardened, the impression is carefully cut away, and we have a model of the mouth with the crowns in position. A "bite" is taken and the articulation secured in the

Fig. 7.

usual manner. The remaining crowns, having been backed, are fitted, and the face of the work imbedded in investing material.

The whole piece is now united at the back by soldering, and when finished presents the appearance shown at Fig. 7.

Fig. 8.

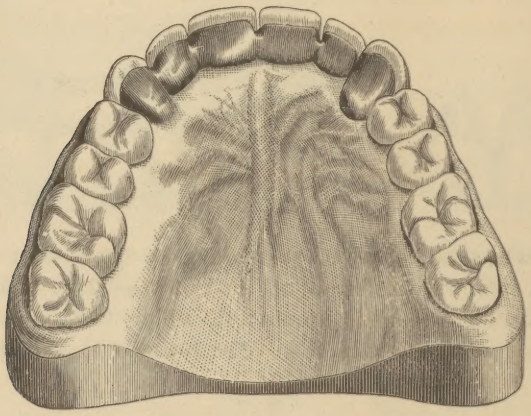
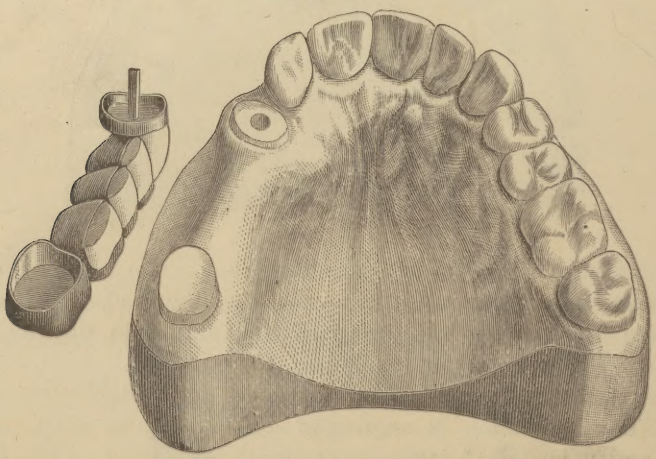


Fig. 8 shows a model of the mouth after the bridge has been cemented in place.

Fig. 9 is an illustration of a piece of this work for which there is a very frequent demand. It is for supplying the loss of the first

Fig. 9.



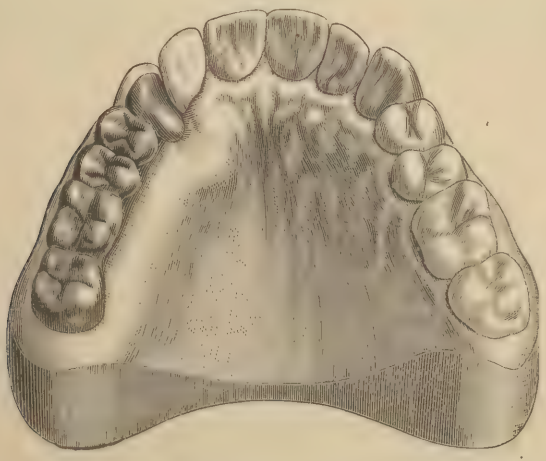
molar and bicuspids. If the canine is intact the anterior end of the bridge may be attached by a strong band of clasp-metal passing around the canine, partly beneath the margin of the gum, so as to present the least possible exposure. If, as is frequently the case

there is extensive decay, it will be best to excise the remaining portion of the tooth and replace an artificial crown as shown in the illustration. A gold cap is then made for the second molar. If this tooth is decayed it will only be necessary to remove the decay, and the cement which is used for setting the bridge will make the most perfect filling-material beneath the gold cap. The intervening molar and bicuspid crowns are made in the following manner:

Fig. 10.

the porcelain faces, which are furnished by The S. S. White Dental Manufacturing Co., are backed with gold or platinum and the tips ground squarely off. Zinc pattern-dies, an assortment of which should be made from the grinding surfaces of molars and bicuspids, are used for swaging from pure gold a tip or cap for the protection of the porcelain face; for without this protection the porcelains would be almost certain to be broken. The concave surface of these tips is filled by melting coin-gold into them. This surface is then ground

Fig. 11.



smooth and fitted to the squared surface of the porcelain face and waxed in position. Triangular pieces of platinum are then cut of the proper size to fit the sides of the tooth, waxed in position, and the whole invested, leaving the back open, which is filled with coin-gold.

These teeth are then fitted into position in the bridge, as previously described.

Fig. 11 shows the completed work in the mouth.

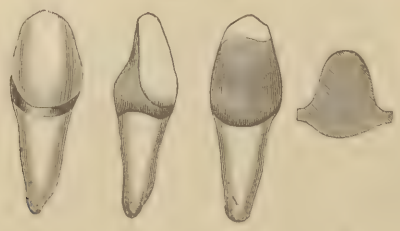
Where only one molar or bicuspid is lost, sufficient support may be gained by the cap, which is made to pass over the adjoining molar. If the first molar and second bicuspid are lost, the anterior end of the bridge may receive sufficient support from a strong spur, which may rest in the groove or sulcus between the cusps of the first bicuspids; or this groove may be deepened into a cavity, into which the spur projects and around which a filling is placed.

Fig. 12.

Fig. 12 shows a piece of work made for a case of quite frequent occurrence. It represents the restoration of the inferior bicuspids and first molar of the right side. A gold crown is made for the second molar, and then the three intervening artificial teeth or "dummies" are made as described above. For the support of the anterior end of the bridge the method hitherto practiced has been to excise the crown of the cuspid and fit a porcelain crown with gold backing to the root, and to this the anterior end of the bridge is soldered.

Fig. 13 illustrates a device which obviates the necessity for removing the cuspid crown. A gold band is fitted around the cuspid. At

Fig. 13.

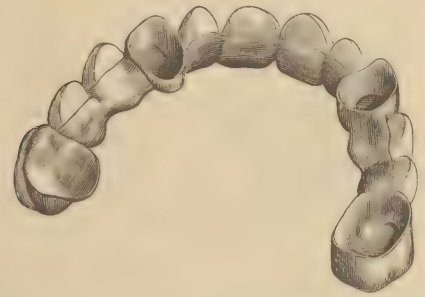


a. *b.* *c.* *d.*

the front, shown at *a*, Fig. 2, this band is allowed to pass a little beneath the margin of the gum so as to make the smallest possible exhibition of gold. On the lingual aspect of the tooth this band is allowed to be nearly the length of the crown. It will be seen that when this band is fitted as perfectly as possible there must necessarily be quite a vacancy between the upper part of the lingual surface of the tooth and the band. It is important that this portion of the band fit the tooth perfectly, and an accurate adaptation is obtained as follows: A piece of pure gold, rolled to 35 American gauge, is fitted over that portion of the lingual surface of the tooth which it is desired

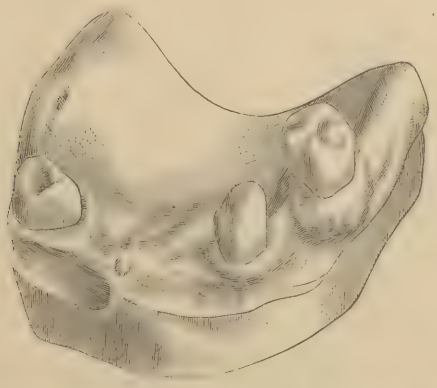
to cover. *d*, in Fig. 13, shows the shape that this little pure gold plate usually assumes. It can easily be fitted perfectly by the use of a burnisher, and then, with the band in position, a drop of melted resin wax is flowed into the space between the pure gold and the band It is now removed from the tooth, invested, and, after melting out the wax, solder is flowed into the vacancy, filling completely the

Fig. 14.



space occupied by the wax. The top of the lingual portion will now be thicker than is necessary, but can be easily ground or filed down to the proper thickness. We now have a band which fits all portions of the tooth perfectly. The anterior end of the bridge is soldered to this band, and after the work is properly finished it is

Fig. 15.

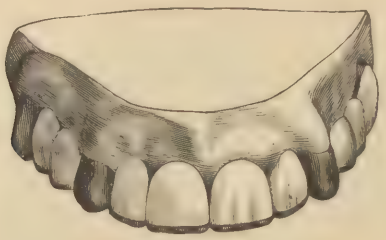


cemented in place in the usual manner. *b* and *c*, Fig. 13, shows side and lingual views of this band after the fitting is completed.

Figs. 14, 15, and 16 illustrate a method of inserting extensive pieces of bridge-work in cases where there are no natural teeth or roots for supporting one end of the bridge. By this method bridges may be inserted in cases where all of the teeth on one side of the mouth

have been lost, or where all of the teeth anterior to the molars on both sides are wanting. Crowns are first fitted to the teeth which remain. These crowns being in position, an impression is taken. From this a cast is obtained with the crowns in their proper position. A second impression is also taken of that portion of the mouth where there is no natural support for the bridge. From this impression me-

Fig. 16.



tallic dies and counter-dies are obtained, from which is "struck" a small gold plate about three-fourths of an inch in length and width, the size of the plate varying according to position and other conditions. After this little plate or "saddle" has been perfectly fitted, it is waxed in the proper position on the model, with the crowns. The intervening teeth are now placed in position, and the work invested and soldered.

Fig. 17 illustrates another device for obviating the necessity for

Fig. 17.

removing the crowns of natural teeth in preparing the mouth for bridge-work. Crowns are fitted in the mouth to the points of attachment in the usual manner. An impression is taken, bringing the crowns away in their proper positions. From this the cast or model is obtained. Heavy bands of half-round gold or platinum bars are now fitted around the necks of the natural teeth on their lingual surfaces. These bands being waxed in position serve to connect

the different parts of the bridge, uniting them in one piece without the loss of any of the natural crowns. We have found this a highly satisfactory method of inserting extensive pieces of the work. Fig. 18 shows the mouth as presented for which the piece shown in Fig. 17 was constructed. Fig. 19 shows the piece in position.

Fig. 18.

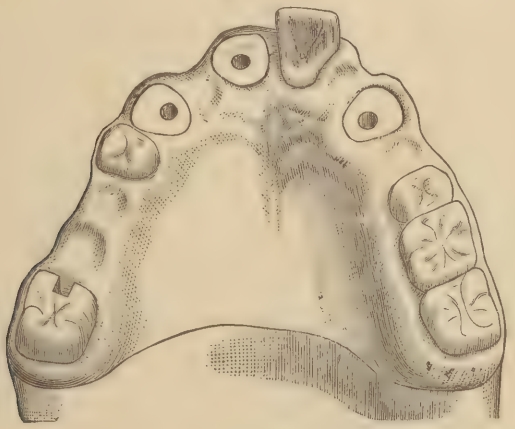
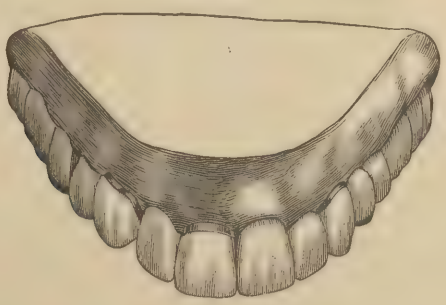


Fig. 20 illustrates a case which is a type of a class of frequent occurrence. Alternate molars and bicuspids in the upper and lower jaws are lost until the occlusion is somewhat changed, and the force of mastication is gradually brought upon the front teeth. Rapid wearing of the teeth results. These cases are among the most difficult that the operator is called upon to treat by the ordinary

Fig. 19.



methods. In the case herewith illustrated the lower bicuspids with a molar on one side were in good condition, but the loss of the upper bicuspids and molars made them useless. As usually happens, the upper incisors had suffered most. The lower incisors were restored by capping them with cohesive foil. The bridge shown at

Fig. 21 was constructed for the right side of the upper jaw, while the teeth on the left side were restored by contour work, as shown at Fig. 22.

The superiority of the condition of this patient's mouth, which resulted from this work, over anything which could have been accomplished by plate work is almost inconceivable to one not familiar with these methods.

The most extensive pieces of this work which have been attempted are cases of twelve and fourteen teeth upon three and four roots-

Fig. 20.

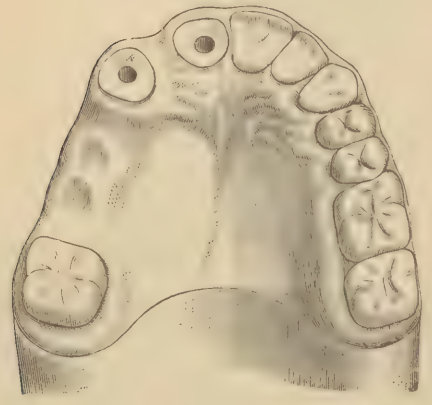


Fig. 21.

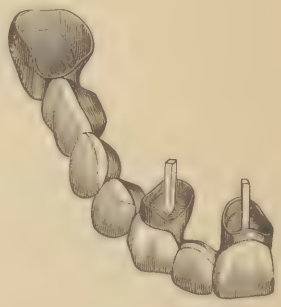
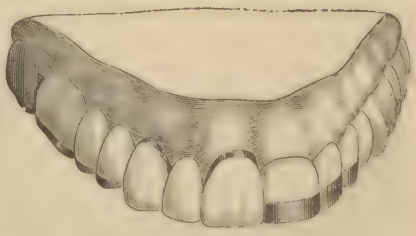


Fig. 22.



Several of these have been worn for three years or more and none of which I have any knowledge show any signs of failure.

The practice of extracting badly-decayed and broken-down teeth, particularly when they became a source of constant annoyance, and replacing them with artificial substitutes mounted upon rubber, celluloid, or metallic plates, has become so firmly established in the public and professional mind as the proper and unavoidable thing, that the folly of such practice can only be demonstrated by persistent and long-continued endeavor. The statement, therefore, that it is no less a criminal practice, *in principle* if not in degree, to extract a tooth be-

cause it is in an ulcerated or broken-down condition, than would be that of amputating a finger because of the appearance of a felon, or removing an eye to get rid of a cataract, will seem a radical one. But if my experience has taught me anything it certainly is no exaggeration of fact. Diseases of the teeth and the surrounding tissues are certainly as amenable to treatment as are ulcers or morbid growths in other parts of the body. The only conditions necessary to the successful accomplishment of this are requisite knowledge and skill in the operator and a desire on the part of the patient to have a healthy mouth.

A properly-made artificial crown mounted upon a root, the investing membrane of which is in a healthy condition, is quite as useful and, all points considered, perhaps quite as desirable as a pulpless tooth with its natural crown intact. Such is my confidence in the intrinsic merit of bridge-work that I think it requires no very great degree of foresight to predict that the day is not far distant when a large per cent. of the now prevalent partial plate work will be a thing of the past.

I believe that my experience in inserting a very large number of these crowns and bridges, and the satisfaction and delight of patients as expressed in many letters in my possession, warrant me in claiming for the new work the following advantages: It is the most beautiful imitation of the natural teeth ever invented. It is the most comfortable, there being no plate covering the roof of the mouth, so that after a few days there is nothing to indicate that the patient has not his or her own natural teeth. It is the most cleanly work, as every part can be easily reached with a brush, and the highly polished surfaces of gold and porcelain are without difficulty kept free from deposits.

It is most serviceable for the purposes of mastication, there being absolutely no movement, the work being firmly cemented to the roots.

Patterson & White, Prs., Philada.